

Science Lab Report Requirements (2022-2023)

A good scientist needs to be able to *communicate* their experiment and findings to others. After all, if you make an important discovery and don't tell anyone about it in a way that they can understand, what's the point?

Formal science reports tend to all be structured in the same way. There is an *introduction* to explain background information and the purpose of the research, a *methods* section to describe the experiment being performed, a *results* section to describe what was found in the experiment, and a *discussion and conclusion* to interpret the results and explain how they relate back to the real world.

Below is a summary of expectations for lab reports. Important note: not every section will be required for every lab report. Make sure to pay attention to your teacher's instructions for each lab!

1. Title, Name, Date, Block

2. Research Question

What question is being answered in this experiment?

In some cases, the research question will be given to you to copy into your lab report. In others, you will be asked to come up with the research question on your own.

In general, a good research question should include the independent variable (what is being tested by the experimenter) and the dependent variable (what is being measured or studied).

Examples:

- How does amount of time studying (i.v.) affect test scores (d.v.)?
- What effect does regular exercise (i.v.) have on heart health (d.v.)?
- How absorbent (d.v.) are different brands of paper towel (i.v.)?
- How does colour (i.v.) affect how quickly something heats up when exposed to white light (d.v.)?

3a. Introduction: Background Information

What background information is relevant to someone trying to understand your experiment? Elaborate on all concepts that you think will be relevant to your specific experiment, based on what you are learning about in class.

Make sure to cite all sources of information used (e.g. textbook, website, YouTube video) and put things in your own words wherever possible. Use APA in-text citations ([style guide here](#)), and ensure you include a bibliography at the end of your lab report.

Example:

Energy comes in different forms. These forms coexist and can be converted between each other. Thermal energy is the type of energy commonly known as 'heat'. Depending on the amount of thermal energy found in a substance, the particles will move faster or slower according to the Kinetic Molecular Theory (Sandner et al., 2016).

Conversely, light energy is a type of electromagnetic radiation typically emitted by hot objects (BYJU'S, 2022). Different colours of visible light correspond to different energy levels. For example, red light has less energy than blue light (Sandner et al., 2016).

Objects differ in the way that they interact with light energy. Specifically, different colours of objects will absorb, reflect, or transmit different colours of light (Sandner et al., 2016). For example, an opaque red object will reflect red light and absorb all the other colours. A black object will absorb all colours of light, and a white object will reflect all colours of light.

3b. Introduction: Experiment Summary and Prediction

Briefly summarize your experiment in 1-2 sentences. If you are struggling to get started, you can rewrite the research question and describe how your experiment will help you answer this question (e.g. “This experiment seeks to determine the best way to study for a science test. We will be testing this by comparing the effect of studying alone versus studying in small groups, on test performance.”)

Predict what will happen in your experiment and/or predict the answer to your research question. Explain your reasoning, drawing upon scientific concepts (that were already covered in your introduction) wherever possible.

Example (continued from “Background Information”):

In this experiment, we will be investigating how quickly different-coloured objects change temperature when exposed to white light. When visible light is absorbed by an object, it is converted into thermal energy. Because dark coloured objects absorb the most visible light, we predict that the temperature change will be highest in the black t-shirt when compared to the white t-shirt.

3c. Introduction: Pre-lab Questions

Sometimes, your teacher will give you pre-lab questions that can be used in place of an introduction or in addition to an introduction.

Complete pre-lab questions in full sentences. Ensure that you explain any scientific concepts in your own words, just like you would in a ‘proper’ introduction. Ask your teacher if citations are required or not.

4a. Methods: Materials

List all materials used in the experiment. Make sure to include sizes, quantities, and other details (e.g. What size beaker? How many beakers? How long a piece of tape? What brand of soap?)

Example:

- *2x 150mL beaker*
- *1x 10mL graduated cylinder*
- *1x stirring rod*
- *1x hot plate*
- *5g CaCl₂*
- *10g NaCl*
- *120 mL tap water*

4b. Methods: Procedure

List all steps in the experiment. Number them.

Include enough detail so that someone could read your instructions and repeat your experiment exactly, without having to ask you any questions.

See textbook for examples. E.g. Connections 9 pg 18, 96

4c. Methods: Experimental Set-up

Draw a neat diagram of your experiment. Label all equipment in your diagram. This diagram is used to show some of the steps in the procedure that may be difficult to describe without a diagram.

Because this is a drawing, it is okay if some components have been simplified. However, try to keep them to scale. Your drawing should be large enough to see clearly.

See textbook for examples. E.g. Connections 9 pg 218, 309 (unlabelled)

5a. Results: Raw Data

What qualitative and/or quantitative observations did you make during your experiment?

Often, the best way to record observations is in a table. Ask your teacher if need help structuring your results section while planning your experiment.

If your original observations were too messy or hard to read, rewrite them before handing them in.

5b. Results: Graph

For some experiments, your teacher will ask you to prepare a graph or other diagram to show your results.

6. Discussion and Conclusion

Follow specific guidelines for that lab. This will often involve answering discussion questions provided by your teacher.

Complete discussion questions in full sentences. Ensure that you explain any scientific concepts, just like you would in a 'proper' introduction. Ask your teacher if citations are required or not.

7. Bibliography

If you cited any sources throughout your lab report, include the full citations in a bibliography using APA (style guide [here](#) or [here](#)). Works should be listed in alphabetical order and use hanging indents (first line not indented but all other lines indented).

Example:

BYJU'S. (2022). Retrieved from <https://byjus.com/physics/light-energy>

Sandner, L., Britton, P., Chau, V., Jennens, G., & McAleer, N. (2016). *BC Science Connections 8*. McGraw-Hill Ryerson Limited.